

# PHYSICS/GEOLOGY DEPARTMENT

## Geology 101 Lecture

Physical Geology

### Fall 2009 Syllabus

- **Matter**  
Atom-ion-isotopes; matter and states of matter (gas-liquid-solid); ionic, covalent and metallic bondings
- **Minerals**  
Definition of mineral; internal structures of minerals (Nicolaus Steno & Rene Hauy): Substitution of one element by another in minerals provided their radii do not differ by more than 15% ; physical properties of minerals; 95% of the earth's crust is silicate minerals; Si + O forming 75% of the mass of the earth's crust; classification of silicates; rock-forming minerals in igneous, sedimentary and metamorphic rocks (feldspars, micas, quartz, ferromagnesian minerals, clays, calcite, dolomite, halite, gypsum, garnet, kyanite, etc.)
- **Igneous Rocks**  
Crystallization from magmas; formation of plutonic rocks; formation of volcanic rocks; definition of magma & lava; basaltic and granitic magmas; textures in both rock types; intermediate magmas; principal elements in magmas; phaneritic plutonic rocks; aphanitic volcanic rocks; pyroclastics rocks; rock bodies in volcanic (extrusive) and plutonic (intrusive) rocks; origin of magma; Bowen's Reaction series; ore deposits
- **Sedimentary Rocks and Environments**  
Clastic and chemical/biochemical rocks; structures; sedimentary environments: fluvial, alluvial fan, eolian, deltaic, beach, lagoon, tidal flat, organic reef, shallow marine, deep marine, importance of sedimentary rocks
- **Metamorphic Rocks**  
Importance of T, P, and pore fluid in the formation of minerals, textures and structures; major types of metamorphic rocks; regional contact and cataclastic metamorphisms; metamorphic textures (slaty cleavage, schistosity, and gneissic layering) or foliation; non-foliated textures; kinds of metamorphic rocks (slate, phyllite, schist, gneiss, quartzite, marble, amphibolite, metaconglomerate, and hornfels)
- **Geologic Time**  
Geologic time scale; relative and absolute datings; radioactivity
- **Weathering**  
Mechanical and chemical weatherings; products of weathering (regolith and soil) soil horizons
- **Processes of Stream Erosion and Deposition**  
How a drainage system is developed (removal of regolith, deepening of channels, headward erosion and stream piracy, and valley-widening); landslides and creep; flood-plain, deposits; braided rivers; stream terraces; deltas
- **Groundwater Systems**  
Underground distribution; porosity-permeability control; water table; artesian wells; formation of karst topography; sink holes and caves; disappearing streams; perched water table; hydraulic head; cone of depression; artesian wells in the Sahara and seas; thermal springs and geysers; geothermal energy; dripstones; subsidence
- **Plate Tectonics**  
Earthquakes; plates; types of waves and their importance
- **Structural Geology**  
Folds, faults, joints, unconformities  
Importance of structural geology in "oil exploration"

#### Course goals/objectives/student learning outcome:

Goal: The student will be able to understand the Earth and its dynamic activities.

Objective or student learning outcome-the student will:

- Understand the ingredients of atoms, minerals, and rock types.
- Understand the different layers of our planet. (General Education)
- Learn that silicates minerals form 95 percent of the earth crust, and 100 percent of the mantle: and that the Earth's core consists mainly of Fe and Ni. (General Education)
- Learn where Cu, Pb, Zn, Ag, Au, U, Th, and other metals come from.
- Learn how oil is formed, and how to locate trap structures for drilling.
- Learn how to date minerals and rocks by using relative and absolute dating to organize the geologic time scale.
- Learn about radioactivity.
- Understand faults, folds, and earthquakes.
- Get an idea on volcanoes.
- Get an idea on plate tectonics and continents' drifting.
- Study some sedimentary environments and other topics. (General Education)

#### Geology 101-Physical Science

Basics and interrelationships of Earth's composition, structure, topography, and ongoing processes, including plate tectonics. No duplicate credit for GEOL 101 and PHSC 111. Gen Ed. 5 Lec.3 Cr.3

#### Assessment: (General Education as given by the department)

The assessment method used would be by answering comprehensive, but short questions. Ex: You have olivine, mica, granite, quartz, and k-feldspar. A) Strike the wrong word that does not fit with the other four. B) Why did you strike it? Another example: You have these terms: horn, atoll, point bar deposit, loess, moraines, etc., relay each of these terms to its appropriate environment. Another example: Draw a section across the Earth and mention its different parts (layers). Another example: Name the three major waves of an earthquake, and state which one is the most destructive. Another example: What are the volcanic equivalents for: granite and gabbro. Another example: Define density, etc.

**Grading Scale:** 100-80 **A** 79-70 **B** 69-50 **C** 49-40 **D** 39-0 **F**

**Grades determined by:** 4 exams; 3 tests & final (bonus pt. added to tests) – average of all tests. Zero absentee days, gains an extra 5 pts. on the final average.

**Homework:** none

**Make ups:** none    Lowest grade of the three exams would be dropped; final would be counted.

**Textbook:** Earth's Dynamic Systems, 10<sup>th</sup> Edition by W.K. Hamblin and E. H. Christiansen

**Attendance:**

- It is the responsibility of all students to read the attendance regulations stated in the current MSU Catalog.
- If a student's total number of absences (excused and unexcused) exceeds 40% of the total classes, the student is considered not to have completed the course; therefore, at the instructor's discretion the student may be assigned a "WN" for a final grade if the student does not initiate withdrawal before the deadline.
- In the case of an excused absence on the day of an exam, the instructor reserves the right to reweigh the final exam in lieu of a make up exam.
- Students must understand that they are responsible for all material covered and assigned during their absences (excused and unexcused) and that they are responsible for the academic consequences of their absences.

**Students with Disabilities:**

It is each student's responsibility to register with the Office of Services for Students with Disabilities when requesting an accommodation. Any student with a disability is encouraged to contact the Office of Services for Students with Disabilities, Drew Hall, Room 200, (337) 475-5916 Voice, (337) 475-5878 FAX, (337) 562-4227 TDD/TTY, Hearing Impaired. 475-5722.

A student with a disability is responsible for locating the designated emergency exits, the areas of refuge in a classroom building, and is encouraged to develop and discuss the evacuation plan with the faculty member.

**Fire Drill Policy:**

McNeese State University will periodically conduct fire drills. In the event of a fire drill or a related building emergency, all persons in classroom are required to exit the building using posted escape routes or the Area of Refuge for individuals with disabilities.

**Diversity Policy:**

Students should visit the MSU web page at [www.mcneese.edu/policy/diversity](http://www.mcneese.edu/policy/diversity) for information about diversity awareness and sexual harassment policies and procedures.

**Academic Integrity:**

Also, please review the Academic Integrity Policy at <http://www.mcneese.edu/integrity/>